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ABSTRACT

Neither grammar-translation methods in foreign language learning nor the subsequent emphasis on spoken language paid sufficient attention to the importance of fluent reading with comprehension in a foreign language. However, the introduction of new means of testing, notably by multiple-choice questions, stimulated renewed interest in the importance of foreign language (FL) reading. This resulted in refined analysis of FL reading needs and the construction of reading exercises rather than design of models or theories to account for the reading process. At the same time, first language (L1) reading models and theories were losing their mechanical character and beginning to encompass the linguistic factors in a psycholinguistic approach. Second language (L2) reading research also profited from this progress, and theory-building and testing has started in the FL field as well. A review is made of research done in the 70's on the graphic, morphological, syntactic, textual, and semantic levels in reading. Comparisons are made with the L1 research and some speculation is offered on future developments, which may result in more efficient teaching programs and test devices in foreign language reading. (Author/AMH)

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FOREIGN LANGUAGE READING RESEARCH: RECENT TRENDS AND FUTURE PROSPECTS

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Neither grammar-translation methods in Foreign Language learning nor the subsequent emphasis on spoken language paid sufficient attention to the importance of fluent reading with comprehension in a foreign language. However, the introduction of new means of testing, notably by multiple-choice questions, stimulated renewed interest in the importance of foreign language reading. This resulted in refined analysis of FL reading needs and the construction of reading exercises rather than design of models or theories to account for the reading process. However, first language (L1) reading models and theories were losing their mechanical character and beginning to encompass the linguistic factors in a psycholinguistic approach (Clark, Gibson, Goodman, Kempen, Levelt). Second language (L2) reading research also profited from this progress and model and theory building and testing has started in this field also. This article reviews research done in the 70's on the graphic, morphological, syntactic, textual and semantic levels in reading. Comparisons are made with the L1 research and some speculation is offered on future developments which may result in more efficient teaching programmes and test devices in foreign language reading.

INTRODUCTION

In this survey we sketch trends in foreign language (=FL) teaching before 1970 (section 1), developments in testing in the seventies (section 2) and the new teaching approaches these have led to (section 3). Testing stimulated research on FL reading. This in turn profited from the development of models, particularly psycholinguistic models and tests for native language (L1) reading (section 4). The relevance of these models for FL*

*In this article the distinction between L2, second language, and FL, foreign language, is not made.

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examined in section 5, where research is reviewed on one specific point that seems crucial to FL reading: conceptual versus syntactic guidance (section 6). On the basis of examination of these trends some suggestions are offered on likely developments in psycholinguistic teaching and testing aspects of foreign language reading over the next decade (section 7).

FL READING TEACHING BEFORE 1970

Before 1970, neither grammar-translation methods nor the subsequent emphasis on spoken language stressed adequately the importance for FL learners of fluent reading with comprehension in scientific and other non-literary material. In grammar-translation methods, L2 to L1 translation served mainly as a check on knowledge of syntactic structures and lexical items albeit with a view to developing reading comprehension. However, teaching generally comprised oral reading which, in term, involved intensive word by word reading and translation of disconnected sentences. There was also discussion and explanation of difficult expressions and so on. On the advanced level, reading became more extensive. Texts used were mainly literary, but there was little attention to either speed of reading or to detailed linguistic features of the text. Since the final examination generally meant a text to translate, pupils were not very motivated to consider FL reading as a specific valuable communicative skill.

The dominant concern in teaching in the late 50's and in the 60's was speech production. The popularity of the audiolingual method resulted in a diminished concern for the written language and, hence, for reading. For example, Mackey (1965) chose to devote only 10 pages of his 463-page handbook to reading, and even this was limited to isolated words and sentences in games and drills.

There is one exception in the FL teaching tradition before 1970. Specific FL reading courses were developed for engineers and scientists in their own vocational fields (for example: Locke, 1957, Sheldon Jackson and Standring, 1960, Reeves, 1967, Naslin, 1967). The early courses, although aimed at the translation of complete technical and scientific texts, used isolated sentences. In the later courses the sentences were related to a chosen theme. They provided examples of specific and relevant grammatical structures, but the explicit grammar was by no means always limited to relevant reading objective. For example, Reeves (1967) gives conjugations of *craindre, mentir, vaincre, s'asseoir* and the past subjunctive. These are somewhat superfluous for a scientist who wishes to read French for his research.

FL TESTING DEVELOPMENTS SINCE 1970

During the 1960's new methods for testing reading comprehension were proposed (see the handbooks on FL testing of Lado, 1961, and 1970; Valette, 1967 and 1978, Paquette and Tollinger, 1968 and Clark, 1972). Since 1970 they have been applied to FL-teaching practice. Detailed comprehension was tested mainly by multiple choice (MC) questions. Such tests often also contained other types of item to test linguistic features such as syntax and vocabulary, and cultural and literary features. The tests were seldom based on complete texts (Clark, 1972, and Valette, 1977).

In the Netherlands, however, MC-tests on texts (extracts from journals) were introduced in 1967 for national examinations for FL reading com-

prehension. They were constructed by the National Testing Foundation, CITO (see Maas and van Rossum, 1978). The introduction of a new approach to reading in foreign language teaching coincided to some extent with the application of a new law on Dutch secondary education, the Mammoth Law. Initially, possible MC questions were categorized according to different aspects of reading comprehension, following a proposal by Davis (1944 and 1968) adapted to RITP (Research Institute of Applied Psychology) in Amsterdam and CITO. Advice on this category system was taken from Dutch teachers in different types of secondary schools. Questions demanding recall of information, drawing inferences from the explicit information in the text, and word knowledge that cannot be deduced from the text appeared to the teachers to be an ideal combination of MC reading comprehension tests (Ipema *et al*, 1976).

Introduction of these tests stimulated debate on FL reading and gave rise to some critical remarks from teachers. Wesdorp (1975) reported that: 1) they considered speed was an important aspect of extensive reading which was not measured; 2) the journal extracts did not allow a flexible reading approach adapted to different objectives; 3) MC questions were not suitable for all kinds of text-summaries and non-verbal reactions were thought to be worth considering as testing approaches; 4) the teaching method and the final examination might (wrongly) conflict; 5) the validity, in particular the construct validity, of the tests was questionable. Of these, the last point seems to be the most serious one. The tests are generally based on definitions in product terms and not on a description of operational components in process terms. To adequately test FL reading comprehension, it is not only important to know what it is, but also how it works (Maas *et al*, 1978).

In order to compare different tests, a validation study was carried out by CITO, partly based on Davis's category system. Categories included word knowledge in and out of context, grammatical insight, the drawing of conclusions, the recognition of a writer's tone and mood, the following of the structure of the passage and the speed of reading. Not eliminated were the effects of certain contaminating factors. For example, different tests were not based on the same text. Order of presentation was not controlled to eliminate learning effect. Furthermore, the correlational analysis used could not permit conclusions about causality.

In spite of these methodological shortcomings, it was interesting to discover that word knowledge tended to relate better to reading comprehension ($r = .22$ to $.52$) than did grammatical insight ($r = .25$ to $.35$). Word knowledge within contexts appeared to correlate, only moderately (.49) with word knowledge out of context. Thus not all meanings can be deduced from the text itself. In general the correlations between the different test results appeared to be very low, whereas the different tested elements proved elsewhere to be important factors in FL reading success (see sections 5 and 6).

During this period developments in testing outside the Netherlands led to the inclusion of textual and contextual (extralinguistic) factors in reading, and the introduction of such test techniques as (modified) cloze and recognition of irrelevant words inserts in texts (Davies, 1977). Davies (1978) notes that reading tests include elements of *discrete-point* tests (which test a linguistic analysis on a taxonomic basis, and include items on phonology, vocabulary, grammar, semantics) and of *integrative* tests (which treat reading as an integrative skill). Reviewing test-handbooks from 1961 to 1978, he concludes that there was a shift from psychometric-structuralist testing to psycholinguistic testing from use of taxonomy to break down language performance into discrete parts, towards an integration of the parts in

a whole. Cloze and dictation were considered as particularly useful integrative tests.

Both the Dutch and the international developments in FL reading tests pointed to the fact that reading tests rarely have a theoretical framework based on analysis of what happens in FL reading. At the moment the trend seems to be to test (and teach) as many aspects of the reading process as possible: including flexibility in attaining objectives; recall and interpretation of factual information; phonology, grammar, vocabulary and text structure. Integrative items testing speed of processing in extensive reading are also used. Test construction needs however to be informed by valid (but operationalisable) models of comprehension as well as by pedagogical concerns. We turn now to what has occurred in foreign language reading teaching since the introduction of new tests.

FL READING TEACHING SINCE 1970

Since 1970, partly due to the influence of test development, partly as a reaction to the oral approach, reading has been better recognized as an objective of FL learning, both in language for special purposes and more generally. Analyses of reading needs have been made. For example Norris (1970) specifies 14 needs. These include: reading speed; recognition and comprehension of vocabulary; comprehension of sentences and of whole texts. Reading exercises have also been analysed: Kocourek (1972) classifies content processing exercises into 7 basic types. The abstracting type alone covers 13 subjects and can generate 52 potential varieties.

Grammatical analysis in reading is sometimes stressed, for example by Saville (1973) and in the bracketing technique of Butler (1973). Others focus on vocabulary acquisition in reading. Thus Berggren *et al* (1973) and Cortese (1976 and 1977) propose exercises in forming scientific words. Or both analysis and vocabulary may be treated: for instance in the exercises on lexical and syntactic cohesion of Coulon *et al* (1972) and Mackay and Mountford (1976).

An interesting teaching approach of Coulon *et al* (1972) provides two versions of a text for the FL readers. The same message can be expressed in different ways. A preparatory, linguistically simplified version is followed by the original. The simplified text can be used to become acquainted with the subject and the vocabulary. The second permits study of more complicated linguistic means of expressing similar content. Cortese (1976 and 1977) bases her exercises on the list of Norris (1970), mentioned above. She devotes attention to the role of the first language, and gives a list of 32 misleading cognates in Italian and English. She recommends contrastive analysis both between registers and languages as the best way to enhance the student's capacity to recognize linguistic structures contrasting with his L1.

Recent developments in discourse analysis have been reported by Widdowson and by BELC and CREDIF researchers in France (e.g. in contributions to the second AUPELF conference on French studies, Strasbourg 1977). They reflect the growing shift from intensive reading of isolated sentences for accuracy to extensive reading of complete texts for fluency (Brumfit, 1977). There is no general agreement on how to describe and analyse tests, however, and the importance for FL teachers of the jargon of a new linguistic description and the importance of textual analysis by readers for comprehension should not be exaggerated. Several weak points in recent teaching programmes

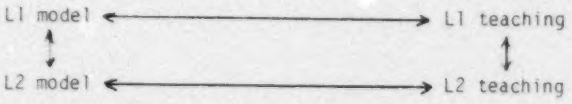
for FL reading must also be noted:

1) lists of reading needs, objectives and exercises are not ordered in a hierarchy of importance: one needs to establish which exercise applies to which objective and which objective is the more important for FL reading comprehension.
2) FL reading teaching concentrates rightly on language factors, but in this way risks underestimating possible reading universals common to L1 and L2 such as oral, aural and silent stages in reading development (Pugh, 1978). A pilot investigation by Neville and Pugh (1975) shows that the technique of variable (aural) pacing of silent reading reduces overt vocalization in an L2 reader and increases his comprehension and speed for at least one type of reading, namely sequential following of a text for thorough comprehension as tested by recall of the author's interpretation of the information he deals with. With this technique a text can be recorded at several rates, and by listening to the tapes adult L2 readers move from word by word interpretation of a text to an appreciation of syntactic and conceptual groupings signalled by the intonation patterns of the aural pacer. The reading while listening technique has proved to be useful for acquisition of L1 reading skill in several empirical studies (see Daly *et al*, 1975). This approach appears to reflect the natural acquisition order (a child starts learning to read only after having mastered oral and aural skills), but such an order does not necessarily apply in L2 acquisition. More research is needed on whether oral and aural stages are helpful when the objective involves only L2 reading (see Sokolov, 1972). This seems to be particularly relevant to FL reading training for scientists as in, for instance, Russian. An aural stage may, however, restrict the visual behaviour of a reader, who must be flexible in adapting reading rate and approach to different objectives. The five reading styles of Pugh, 1978, are relevant here. They include skimming, quick reading for the general drift of a passage or to decide how to read it; scanning, similar to skimming but the search is now narrowed down to specific information such as a date, a number or a name; search reading, similar to scanning but the reader needs to pay attention to various words in a similar semantic field to the topic in which he is interested; receptive reading, or reading for thorough comprehension, for recall of the writer's main points and supporting details; responsive or critical reading, for interpretation of and reaction to the message, in study for instance. One must think not of a single reading process, but of several reading processes in L1 and L2 corresponding to a diversity of reading objectives.
3) FL reading teaching should, but seldom does, take into account the role of knowledge of the mother tongue.
4) Content reading in FL must recognize the importance of contextual factors, background knowledge and non-linguistic information such as illustrations, charts, models, figures and tables. In an experiment on reading French as L2 by Dutch trainee engineers, technical background and knowledge of French were found to be independent factors influencing comprehension (Ulijn, 1975) when carrying out machine-instructions (SHADOK).

Summing up the developments in FL reading teaching since 1970, progress has been made, but several points remain to be considered more carefully. In this regard it is disappointing that FL reading receives little, if any, attention in recent FL acquisition research surveys. Hakuto and Cancino (1977) are only concerned with productive aspects, Cook (1978) with psycholinguistic perspectives on productive aspects and such factors as

attitudes, motivation, memory and optimal age. Shaw (1977) omits reading in his survey on FL syllabus development, even in the functional-notional approach (see for criticism on this score: Ulijn and Wijkamp, 1978, and Ulijn, 1977b). Strevens (1977) in his list of communication categories for special-purpose language learning makes some reference to professional FL reading. Brumfit (1977), writing of teaching advanced reading skills in English as an FL, surveys the most important teaching trends but, surprisingly, gives very few references to theoretical psycholinguistic models in L1 or L2 reading. As stated in section 2 the literature on testing is more concerned with this aspect (Davies, 1978).

Without a solid theoretical basis, it is difficult to determine the most efficient way to teaching FL reading. Clarke and Silberstein (1977) attempt to develop such a framework on the basis of psycholinguistic research results, but they miss what, in our view, is an important step, namely designing and testing specific L2 reading models. We think that the best approach would be:



The two way interaction L1 to L2 is of utmost importance for the role of L1 in L2 reading teaching. Nonetheless L1 reading models can be useful for both FL reading testing and teaching. We review them briefly in the next section with a view to considering their applicability to L2 reading.

PSYCHOLINGUISTIC MODELS FOR L1 READING

Roughly three kinds of models* can be distinguished. Before 1970 *reading teaching* models were dominant, with some reference to linguistic factors (Robinson, 1966; Gray, 1960). Readibility formulae belong to this category (Klare, 1963). After 1970 *functional psychological* (Mackworth, 1972; Rothkopf, 1972) and *psycholinguistic* models came more into prominence.

Reading teaching and functional psychological models stress the aspects common to L1 and L2, whereas psycholinguistic models are more language specific. We are convinced that the psycholinguistic models are more pertinent to L2, since it is a commonplace observation that a FL learner normally starts FL reading after having learnt to read in his mother tongue. So what remains to be acquired is the language and mastery of its specific difficulties and not so much the more general reading characteristics.

All psycholinguistic models distinguish several linguistic levels operating in reading: e.g. *graphonic* or *graphemic*, *lexical*, *syntactic*, *semantic*, *textual* (Goodman, 1976 and Kolers, 1973). They have been examined in many experiments, a few of which are referred to here.

Graphemic/lexical. Koler's work is well-known in this field: he is mostly concerned with tests which require subjects to read geometrically transformed text. Letters, words and pseudowords are presented in normal

*The term model corresponds in this survey more to approach, conception, framework. A scientific model would be an abstraction of the reality, allowing all kinds of predictions, which occurs rarely here.

sequence, as well as rotated and reversed in various ways (Reich and Reich, 1976). It is at the graphic and phonemic levels that dyslexic children appear to have major problems, rather than at higher order linguistic levels such as the syntactic and semantic (Thomson, 1978). Studies at this level are not, of course, very relevant to normal text reading.

Syntactic/semantic. Since 1966, Fodor *et al* (1974) have been concerned with the effectiveness of perceptual mapping rules or heuristic procedures. These are operations which enable listeners or readers to draw a conclusion about semantic/syntactic relations in the text via syntactic means, such as collocations of words, word order, morphology, affixes, suffixes, and function words such as prepositions, conjunctions, auxiliaries and articles.

Textual. A reader must recognize characters, words and syntactic structures, but in order to make sense of all elements involved in the text, he must combine sentences, recognize paragraphs, sections, chapters and the discourse structure of a text. Important for textual processing is the interpreting of *anaphoric* references as has been shown by Chapman (1979) for seven year old children and by Garrod and Sanford for adults (1977). Identification of substitutions of nouns by pronouns across sentences is an important mechanism for checking semantic overlap in sentences. Even more important seems to be the level at which information is in the hierarchical structure of a text. This factor was demonstrated as a powerful variable in the structure of prose in a study of Meyer (1975). Undergraduate psychology students could much better recall information high in the content structure of one passage than when the same information was low in the content structure of another passage.

Experimental evidence on the operation of these different levels in reading does not mean that we know the conditions, temporal constraints or developmental stage governing their application, nor how they mesh in with each other, nor how they interact with non-linguistic aspects of reading such as mathemagenic (Rothkopf, 1972) and contextual factors. Three types of model try to predict the kind of integration involved in the reading process: *bottom-up* or *serial*, *top-down* or *analysis-by-synthesis* and *interactive*.

A good example of *bottom-up* or *serial* is Gough's model (1972). He posits a strictly passive serial process: a letter-by-letter visual analysis, leading to positive recognition of every word through phonemic encoding. In this model, higher processes (e.g. semantic and syntactic analysis) do not influence lower processes (e.g. orthographic and phonemic analysis). Reading thus proceeds completely from the bottom up. According to this model, anticipatory behaviour would not be used by a skilled reader. However, this approach conflicts with the overwhelming experimental evidence that the semantic bias (which according to Gough would come last) exerts a strong effect in disambiguating words or sentences (which in this model comes earlier in the serial process). *Top-down* or *analysis-by-synthesis* stems from theoretical and experimental work by researchers such as G. A. Miller, K. S. Goodman and P. A. Kolers. Thus, Smith (1973) argues that meaning identification is prior to word identification which, in turn, precedes letter identification. The essence of these models is that analysis of the sensory signal begins centrally with the derivation by the reader of a hypothesis regarding the information in the sensory buffer. Reading is seen as an active hypothesis-forming activity going stage by stage from the semantic top to the formal linguistic bottom, until the semantic representation of the text is reconstructed. Having once guessed the real sense on the top, an efficient reader need not analyse all "bottom"-elements in the text, such as the

phonemic cues: reading is a guessing game (Goodman, 1976).

A problematic aspect of this approach is its temporal organization: it implies a lot of hypotheses to be made. It seems more economical to recognize words early in the reading process, with perhaps two or three senses, quickly limited to one by the context, than to leave open a dozen of hypotheses starting from all the semantic and syntactic possibilities of a text. (For further discussion of controversial aspects of the analysis-by-synthesis model see Froese, 1979). It is not surprising that Wildman and Kling (1979) conclude on the basis of their experimental results with anticipation in reading that the analysis-by-synthesis or hypothesis model survives as a viable theory of reading only under condition of highly predictable, very redundant semantic content or without regard to reasonable time constraints. This model is less plausible, when the semantic content is normal.

The most convenient way to account for all experimental evidence seems to suppose an *interaction* between all linguistic levels in reading. They are operating simultaneously and interdependently. There is not a strict bottom-up or top-down order, since a good combination is less time-consuming (Rumelhart, 1977). This approach coincides with what is known from the literature of skills. The several linguistic levels (letters, words, syntactic structures and text) can be compared with subskills which are organized into a hierarchy and whose operation demonstrates other characteristics of skilled behaviour such as anticipation, feedback, automation (see Herrior, 1971, Levelt, 1975, and Ulijn, 1977a). In this respect reading comprehension is usefully seen as a skill.

What remains problematic in all types of models mentioned up to now is the semantic factor in reading. Gibson and Levin (1975) focus more on semantic aspects related to linguistic levels in reading, but their experiments do not go beyond the lexical level. The most powerful interactive reading model can be derived from the psycholinguistic literature concerning the language user in man, since this permits an integrative view of comprehension, semantic and syntactic aspects (see Kempen, 1976, and Ulijn, 1978, and the literature they refer to). It contains six main systems: the speech or script recognizer, the sentence parser, the conceptual system, the lexicon, the sentence generator, the articulator or handwriter. Only the first three are at work in reading, or four if we consider the eyes also (cf. Figure 1).

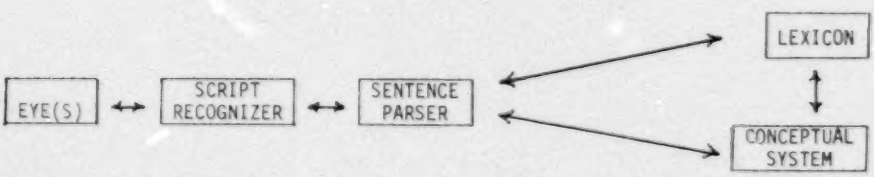


Figure 1: *The reader in man.*

A central position is occupied by the *conceptual system* and the *lexicon* linked to each other. The reader of a foreign language uses his conceptual system and his foreign language lexicon in order to build a structure of concepts that represents the meaning of each input sentence, that is, the "conceptualization" underlying each sentence of the text. Use of the concep-

tual system implies an *inference* mechanism also: a reader infers information necessary for comprehension but not explicitly given in the written text. For these inferences he draws on background knowledge and on contextual information outside the running text, in figures, formulae, drawings, etc. (See experimental evidence in Tuinman, 1972, and Johns, 1978). In such activity the functioning of the *sentence parser* and its reliance on the lexicon and the conceptual system are crucial. Kempen (1976) and Clark and Clark (1977) proposed both a syntactically guided operation and a semantically (or conceptually) guided operation of the sentence parser on the basis of the experimental literature they cite. "Syntactic" means that a preliminary *thorough* syntactic analysis, including function words, would be performed, but this still has to be complemented by a conceptual analysis. "Conceptual" means that primarily content words are spotted in the text and linked to concepts by means of the lexicon and conceptual system. A syntactic analysis is only performed *a posteriori* if this is still necessary for efficient comprehension. Before checking these different models and experimentation for their relevance to L2 reading, it is advisable to caution against overgeneralising because of the following shortcomings:

1) linguistic and conceptual factors are often very roughly described;
2) cited experimental work is exploratory rather than hypothesis-testing;
3) the correlation coefficients used to test models do not necessarily imply a causal relation (Henning, 1975, and Klare, 1978).

THE RELEVANCE OF L1 PSYCHOLINGUISTIC MODELS FOR L2

Preference may be given to interactive models for foreign language reading on the same experimental basis as for L1. It must be noted, however, that L2 reading may be less of a guessing game, than reading in L1: Douglas (1978) found from scoring cloze tests in three different ways, that the better readers did not make any better guesses about items they were unsure of, than did the poorer readers. It seems likely that when an L2 reader tries to predict what is coming in the text, he forgets the past cues; when he tries to concentrate on the post cues, prediction is impaired. There are nevertheless certain similarities between L1 and L2 reading. Most of the 113 attitudes, concepts and skills mentioned in the *Guide-lines for the Professional Preparation of Reading Teachers* (IRA, 1978) apply also to L2, but there is a problem in that lists of this kind do not provide a hierarchy of what is of importance for reading success. Results of two studies by Cziko (1978) suggest that syntactic, semantic and discourse contraints serve as important sources of information for the fluent first-language reader and that much of the difficulty in reading a second language may be due to the inability of the second-language reader to make full use of these contraints.

However, syntactic and textual levels do also operate in L2 as has been illustrated by studies of reading errors (Ulijn, 1978a). Skills aspects seem to be similar. A quick L1 reader is also a quick L2 reader. Deering (1978) reports that the correlation between French and Dutch reading speed of the same Dutch students was 0.67 ($p<0.01$), although the automaticity degree is much lower (see also Oller and Tullius, 1973, and Ulijn, 1977a), and participation and feedback capacity is limited (see results of Douglas above).

But there is one striking difference from L1 in that L2 reading is hindered by imperfect knowledge of L2 and by interference from L1. In the applied linguistic literature there are several approaches which try to account for similarities and differences between L1 and L2 learning and the role of L1

in L2 reading. However, these approaches which include contrastive analysis, error analysis, interlanguage and identity hypotheses (see Hakuto and Cancino, 1977) are not related to L2 reading, nor are studies on bilingualism. The L1 model of the language user in man seems to account the best for comprehension, conceptual and syntactic factors involved in L2 reading. An L2 model, in our view, should be based on this and contain a prediction of the L1 role in L2 reading as well.

Since L2 reading is also comprehension-oriented and linguistic factors are particularly relevant, the dilemma of conceptual versus syntactic guidance is an important issue. We next review some experimental evidence on it.

CONCEPTUAL OR SYNTACTIC GUIDANCE IN L2 READING

In the previous section we have given a definition of two operations or strategies that are possible for the sentence parser in order to detect the conceptualization of a sentence: conceptually guided reading or syntactically guided reading. We now limit the discussion to sentence level, but one can surmise that the processes involved extend to the textual level as well. The syntactic/conceptual distinction corresponds, more or less, to the operations suggested by Coste (1978). He proposes an *onomasiologic* orientation going from sense to form (conceptual guidance) and a *semasiologic* orientation going from form to sense (syntactic guidance). Experimental results on both are somewhat inconclusive. Aronson-Berman (1978) proposes the thesis that a major component of difficulty encountered by advanced level students in reading L2 texts is the nature and degree of syntactic complexity. A pilot study conducted by Aronson-Berman with Hebrew-speaking college students showed a significant difference in success in comprehending two versions of an English text, one syntactically simplified, the other not, but with a similar content and vocabulary. If reading is mainly conceptually guided, any syntactic variants would play only a minor role.

Vocabulary usually appears to be a more serious obstacle, however. Results of questionnaires on ESL reading difficulties handed out to students with varying linguistic backgrounds ranged for vocabulary from 3.23 to 3.36, and for grammar from 2.19 to 1.29 (5 = very difficult, 1 = no difficulty; Yorio, 1971). High correlations are found between reading comprehension and vocabulary (Konttinen, 1978). In the second section we mentioned a higher correlation for comprehension with vocabulary than with grammatical insight (Maas and van Rossum, 1978). A recent pilot experiment has suggested that Dutch secondary school pupils use verb endings rather than time expressions in order to detect the tense of French sentences. The position of a time expression in the sentence had a minor significant effect (van Wesemael, 1979). Morphology, such as verb endings, and lexicon, such as time expressions, seem to play a more important role than such syntactic elements as word order. These data question syntactic guidance in FL reading.

The SHADOK project (Ulijn, 1978a and 1979) indicated that readers of a foreign technical text were frequently hindered by various content words (e.g. technical terms and nominalisations), which are necessary for conceptual analysis. Syntactic function words hindered them to a much lesser degree. Ambiguous words appeared to be more difficult for comprehension than unambiguous ones.

Conceptually guided analysis has consequences for the role of the L1-L2 contrasts in L2 reading. If the sentence parser is concept-oriented, contrasts in lexis, because they are potential carriers of conceptual confu-

sion, give rise to greater problems in comprehension than do lexical items which are conceptually parallel. Once the conceptual difficulties are surmounted, the reader will be indifferent to syntactic contrasts or parallels in the text. Syntactic contrasts will often remain unnoticed. This contradicts Cowan's conclusion (1976), based on English read by Japanese and Persians and Hindi read by English speaking subjects, that comprehension errors result from syntactic misinterpretation because of L1-L2 contrasts. Unfortunately, his description of the reading process is very superficial and his error analysis very unsystematic.

The SHADOK-project supplied evidence on these two points as might be expected: lexical contrasts (French-Dutch) with the first language (Dutch) were found to be harder for subjects to understand than lexical parallels, i.e. international technical terms (Ulijn, 1978a). However, syntactic contrasts between Dutch and French (such as infinitive and participle constructions that are very frequent in French scientific register and rare in Dutch) delayed the comprehension process only if the conceptual content of the text was difficult to understand (Ulijn, 1977a, Ulijn and Kempen, 1976). This last result was confirmed by a replication experiment (Ulijn, 1978b). From the SHADOK data we conclude that the sentence parser is primarily concept-oriented and that L2 reading is more conceptually than syntactically guided. But this is only one element of construction and testing of the model of the L2 reader in man. Many other aspects require further investigation.

SUGGESTIONS FOR FURTHER RESEARCH IN FL READING

Model and theory-building in L2 reading has just started and can profit greatly from developments in L1 reading research in the last decade. Such reference to L1 work is necessary in order to provide solid bases for teaching programmes and for test construction. We will speculate on possible future developments in psycholinguistic research in L2 reading and its application to teaching and testing in this field. This does not mean that developments in teaching and testing necessarily follow closely on psycholinguistic research.

Possible psycholinguistic developments

In the diagram showing relations between L1 and L2 model and L1 and L2 teaching given earlier, the connection of L2 model construction and teaching necessitate more research into the functioning of the conceptual system, the lexicon and the sentence or text parser. Research into the lexicon or the lexica of bilinguals (compound or co-ordinate--see research reviewed by Reich and Reich, 1976) has particular relevance to considering the role of L1 lexicon in L2 reading. The somewhat exploratory SHADOK-experiment on lexical contrasts needs a careful replication and extension. Both lexicon and syntax used in the experiments had to be limited. Syntax possibly plays only a minor role in reading, but it is hazardous to generalize about *all* structures.

What makes a foreign text hard to understand apart from its lexis? We need to know more of the effect of among other things: paratactic or hypotactic structure, degree of embedding, fore loading or back loading of sentences (whether the main verb occurs early or late in the surface structure), monimalisations and use of non-finite verbal forms. Discourse features must not be overlooked: speech acts (with regard to how explicitly

they are signaled), relationship between information structure and ordering of syntactic elements (logic relations) and cohesive features (anaphoric elements, degree of explicitness of deixes, repetion in structure or vocabulary--see Ingram, 1978). But the importance of these linguistic-descriptive elements should not be exaggerated. Once explored as possible sources of L2 reading difficulty, they may lead to hypothesis-formulation and testing. As in other fields of applied linguistics, what is lacking is *a priori* research in order to formulate hypotheses, and *a posteriori* replications of experiments. This work should be extended to world languages such as English, French, German, Spanish and Russian.

Likely implications for teaching

If L2 reading is primarily concept-oriented and vocabulary poses more problems than syntactic structures, L2 reading programmes should focus on vocabulary acquisition exercises based on frequency counts over all sorts of texts. Since lexical contrasts are more difficult than lexical parallels to process, more attention should be given to misleading cognates between languages. But the role of L1 in learning to read L2 can be overestimated: comparison of scientific and technical French, English, German and Dutch suggests that stressing various parallels is more fruitful than e.g. stressing syntactic contrasts between these languages (Ulijn, forthcoming). A reading grammar coupled with syntactic exercises will continue to be important (see for suggestions Ulijn, 1979), but is more limited than a speaking or writing grammar.

L2 reading will be more and more extensive, but intensive modes such as reading instructions for use or inscriptions in streets and supermarkets will not be neglected. Textual processing exercises will be developed, perhaps on the basis of a typology as proposed by Kocourek (1972). Niedzielski's inference method (1977) which involves didactic processing of different versions of the same text following Coulon *et al's* (1972) idea seems to be very promising. Non-verbal checks on comprehension will be particularly suitable for reading such things as instructions and descriptions of technical processes (see Coveney and Grosjean, 1974). Reading objectives will be more closely specified and lead to practice on specific reading tasks rather than more broadly based exercises.

Likely development in testing

Future developments in the testing of L2 reading will reflect developments in psycholinguistics and teaching. When reading teaching is based on a variety of texts and objectives, then testing will cover the same range. Each test technique has its own weak and strong points. One should try to combine as many strong points as possible in one testing programme:

1) Flexibility and speed testing will be related to e.g. recall and inference tests, two basic forms of comprehension.
2) Not only MC/true-false/open end questions will be used, but also (selective) cloze-techniques (for anticipation, feedback aspects) and abstracting procedures (for discourse aspects, possibly in MC-form).
3) High correlations between different reading tests will not so often be taken to mean that one test can be replaced by another.

Moreover, with a variety of tests the undesired backwash effect which often comes from using only one type of testing on teaching can be avoided.

Tests will continue to be a combination of *integrative* and *discrete* items (Davies, 1978). An overall comprehension test can be followed (or preceded) by lexical, grammatical or background knowledge tests on the same text in order to discover the specific contribution of these factors to a student's FL reading comprehension. Vocabulary testing is likely to become regarded as particularly relevant to testing FL reading for reasons given earlier.

It will be apparent from this account that developments in the teaching and testing FL reading will be only partly contingent on results of psycholinguistic research. This is unavoidable, for teaching is not research, and classes will not wait until clarity has been achieved. Nonetheless it is to be hoped that within the next decade the teaching of FL reading will have been placed on a much more systematic basis than it has been in the past. Psycholinguistic model-making and the building and testing of theories in psycholinguistics can supply the necessary theoretical framework.

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